

# PATENT ABSTRACTS OF JAPAN

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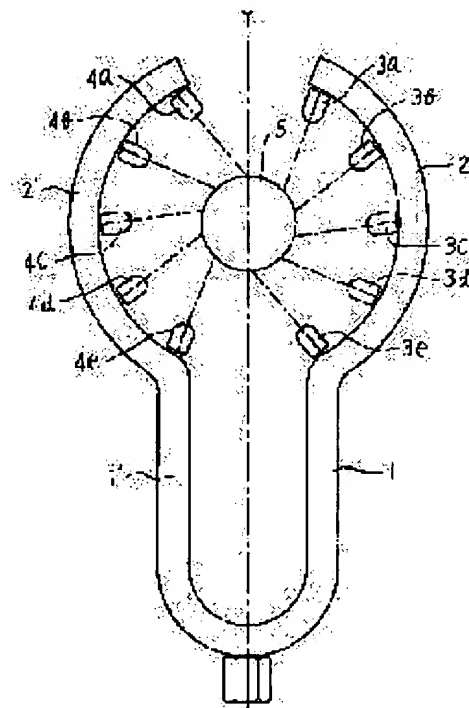
## (54) RING BURNER

### (57)Abstract:

**PURPOSE:** To contrive efficient temperature rise by a method wherein flame ports are arranged so that an intersecting point between the center line of the flame port and the circumference of a cylindrical work is moved along the circumference of the work and are slanted with respect to a plane including the arced sections of opposing conduit tubes.

**CONSTITUTION:** Flame ports 3a-3e, 4a-4e, arranged symmetrically with respect to a center line Y of opposed arced sections 2, 2' of conduits, are so arranged that an intersecting point between the center line of a flame port and the circumference of a work 5 is moved sequentially one by one in the same direction along the circumference of the work 5. By this method, respective flames envelop the whole circumference of the work 5 as a continuous circular flame describing an envelope in the same direction at the circumference of the work 5.

Further, the flame ports 3a-3e, 4a-4e are slanted in the same direction with respect to a plane including the arced sections 2, 2' of the opposed conduits. Air streams, whirling around the circumference of the work as a continuous spiral flame are generated in such a manner that thereby the sucking effect of air is generated.



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DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to gas-pressure-welding welding by the round bar of mild steel and special steel, or contact printing of tubing, and the ring burner especially used for field weld.

[0002]

[Description of the Prior Art] Contact printing (clo-ZUBATTO law) in gas-pressure-welding welding of the round bar or tubing As it is the approach of heating and carrying out the pressure welding of the periphery of a joint near the melting point of an ingredient with gas flame and is shown in drawing 9 as a ring burner conventionally which is used for this welding process, pressurizing sticking both the members to which it is made to join in a plane of composition Concurrent \*\*\*\*\* length section (a) and (a') are connected to a single string in the shape of U character by the end face side. It has the \*\*\*\* radii section (b) and (b') which face a head side, and is formed. To these \*\*\*\* radii section (b) that carry out relativity, and (b') Much nozzle (c1) - (c5) and (c6) - (c10) which have been arranged at the symmetry to the center line y of the \*\*\*\* radii section (b) which faces, and (b') are prepared. These nozzle (c1) - (c5) and (c6) - (c10) that face An intersection with the peripheral surface of the work (d) of the shape of cylindrical or a cylinder is arranged at the symmetry at the periphery of work (d). (c10) is arranged with and (c6) (c5) in the location with which an intersection with the peripheral surface of a work (d) laps mostly. and the conduit which faces -- each nozzle (c1) of the radii section (b) and (b') which is alike, is located in an edge and faces -- moreover, the conduit with which these nozzles (c1) - (c10) faces -- what is horizontally prepared to the field containing the radii section (b) and (b') is known.

[0003]

[Problem(s) to be Solved by the Invention] Though the ring burner of the junction condition in a joint stated with the conventional technique is good and there is especially no problem Each nozzle (c1) (the flame of - (c10) is equivalent to the peripheral surface of work (d) at punctiform, and, moreover, is a nozzle (c1) (with and (c6) (c5), since the flame of (c10) laps in the peripheral surface of work (d))) There are a part where heating is strong, and a weak part, a difference is in a temperature rise, heating to the whole peripheral surface of work serves as an ununiformity, and concentration of heat worsens. Since the part where melting is early since the effectiveness of a temperature rise is bad and heating is moreover an ununiformity, and a late part are made Welding operation must be performed moving a burner for the situation of melting of a joint variously with slight accuracy by viewing. the effectiveness of a temperature rise is bad, since concentration of the heat to the whole peripheral surface of work is bad, it is not necessary to say that the technique with which such an activity became skillful is the need, heating time also increases and needs the amount of the gas used of many working hours and many, and welding is inefficient -- etc. -- there was a fault.

[0004] The place which this invention is made in view of the above-mentioned point, and is made into the object By giving a flame to the part as for which an intersection with the peripheral surface of work carries out sequential migration in accordance with the periphery of work As a flame accompanies the peripheral surface of work, \*\*\*\*\* is drawn one by one and the whole peripheral surface of work is wrapped circularly continuously, while heating the peripheral surface of work to homogeneity Come out, and perfect combustion is obtained and it makes. the envelope of the flame which inclines in the same direction produces the air current which does not acquire the peripheral surface of work spirally but rolls it, and inhales air -- Compaction of an efficient temperature rise and heating time is aimed at, and it is in offering the new ring burner with which efficient welding is obtained, without needing the special skillful technique in which a burner is moved according to the condition of a welding part.

[0005]

[Means for Solving the Problem] the conduit with which the ring burner of this invention faces in order to attain the

above-mentioned object -- carrying out sequential arrangement so that an intersection with the peripheral surface of cylinder-like work may move in accordance with the periphery of work, these nozzles are that the nozzle arranged to the center line of the radii section at the symmetry is cylindrical, or a thing which comes to incline in the same direction to the field containing the \*\*\*\*\* radii section which faces.

[0006] the conduit which faces -- the conduit with which many nozzles established in the radii section face each nozzle -- it is desirable to install in whenever [ vectorial angle / which carried out sequential migration one / at a time / so that it might ask for an intersection with the circle of abbreviation 3/1 from the line which connects the central point of the radii section, and the periphery of work and might go around said intersection of each nozzle in the same direction ].

[0007]

[Function] Since draw \*\*\*\*\* in the same direction by the peripheral surface of a work, it becomes a continuous circular flame, a strong part does not have heating to a package and a work selectively in the whole peripheral surface of a work, either and the nozzle arranged so that sequential migration of the peripheral surface of a work may be carried out at equal intervals is carried out to homogeneity in a flame, a heat insulation effect increases and it improves the heat transfer force. it -- in addition, the operation which produces the air current which a flame turns into flame spiral to the peripheral surface of a work by dip containing the radii section which faces, and rotates the peripheral surface of a work, and inhales air works, and a nozzle can absorb the oxygen in air, can obtain perfect combustion, and can acquire a temperature rise efficiently. Moreover, by wrapping the joint peripheral surface of work in continuous \*\*\*\*\* , a shielding effect also improves, generating of the chrome oxide of a weld zone is decreased and the soundness and the mechanical property of a weld zone are raised.

[0008]

[Example] It has \*\*\*\*\* 1 and 1'. the conduit which is concurrent in drawing 1 if an example is explained with reference to a drawing -- this conduit -- the conduit which connects \*\*\*\*\* 1 and 1' to a single string in the shape of U character by the end face side, and faces a head side -- the radii section 2 and 2' are had and formed -- having -- these conduits that carry out relativity -- to the radii section 2 and 2' the conduit which faces -- the radii section 2, the nozzles 3a, 3b, 3c, 3d, and 3e arranged to the center line Y of 2' at the symmetry, and 4a, 4b, 4c, 4d and 4e are prepared.

[0009] the conduit which faces -- the radii section 2, said nozzles 3a-3e arranged to the center line Y of 2' at the symmetry, and 4a-4e Arrange so that an intersection with the peripheral surface of work 5 may move in the same direction sequential [ one / every ] in accordance with the periphery of work 5, and as shown in drawing 4 , each flame \*\*\*\*\* is drawn in the same direction by the peripheral surface of work 5, it becomes continuous circular flame, and the whole peripheral surface of a work 5 is wrapped. Nozzles 3a-3e, and said 4a-4e the conduit which faces as shown in drawing 2 and drawing 3 -- to the radii section 2 and the field containing 2', it inclines in the same direction, prepares in it, and is made for the operation which the air current which serves as spiral flame continuous to the peripheral surface of a work 5, and rotates the peripheral surface of a work 5 arises, and inhales air to arise, as shown in drawing 5

[0010] The burner shown in drawing 1 thru/or drawing 3 in this example the conduit which is a thing in the case of using it for the work 5 with a diameter of 32mm, and faces -- the radii section 2, the nozzles 3a-3e established in 2', and the sense of 4a-4e the conduit which faces each nozzles 3a-3e, and 4a-4e as shown in drawing 6 -- with the radii section 2 and the line which connects the central point of 2' The intersection P1 with the circle of abbreviation 3/1, P2, P3, P4, P5, P6, P7, P8, P9, and P10 are calculated from the periphery of work 5, and it installs in whenever [ vectorial angle / which carried out sequential migration one / at a time / so that it might go around intersection P1 -P10 of each nozzle in the same direction ]. That is, nozzle 3a is an intersection P2. Installing in whenever [ vectorial angle ], nozzle 3b is an intersection P3. It installs in whenever [ vectorial angle ]. Nozzle 3c is an intersection P4. It installs in whenever [ vectorial angle ] and 3d of nozzles is an intersection P5. It installs in whenever [ vectorial angle ]. Nozzle 3e is an intersection P6. Installing in whenever [ vectorial angle ], nozzle 4e is an intersection P7. It installs in whenever [ vectorial angle ]. 4d of nozzles is an intersection P8. Installing in whenever [ vectorial angle ], nozzle 4c is an intersection P9. It installs in whenever [ vectorial angle ], nozzle 4b is installed in whenever [ vectorial angle / of an intersection P10 ], and nozzle 4a is an intersection P1. Installing in whenever [ vectorial angle ] is desirable.

[0011] although that by which a total of ten of five nozzles 3a-3e, and 4a-4e were prepared in each radii section 2 and 2', respectively was shown in said radii section 2 and 2' -- the number of nozzles -- the diameter of a work 5 -- following -- a conduit -- the radius of the radii section -- size -- it is -- a conduit -- of course according to the magnitude of the radii section, the number of nozzles is also fluctuated

[0012] moreover, the conduit which faces as each nozzles 3a-3e, and 4a-4e are shown in drawing 3 -- it is desirable to set up in the same direction on ten dip to the radii section 2 and the field 2 containing 2', i.e., the radii section, and the horizontal axis X passing through the core of 2'.

[0013] Drawing 7 shows the heating time of the work 5 of a burner and the burner of this invention, and the relation of

a temperature rise conventionally which is shown in drawing 1 , shows the burner of this invention as a continuous line, and shows a burner with an alternate long and short dash line conventionally, and he can understand that the heating time over a temperature rise compares with the conventional thing, and the thing of this invention is shortened about 40 percent from this drawing 7 .

[0014] Drawing 8 shows the heating time of the work 5 of a burner and the burner of this invention, and the relation of gas input rating conventionally which is shown in drawing 1 , a continuous line shows the burner of this invention, an alternate long and short dash line shows a burner conventionally, from this drawing 8 , the gas input rating per time amount compares with the conventional thing, and the thing of this invention can understand that gas input rating is decreasing about twenty percent.

[0015]

[Effect of the Invention] Since an efficient temperature rise is acquired and it becomes economization of the consumption of gas, since this invention becomes the above configurations, and the temperature rise over a joint is made by homogeneity A skilled activity which moves a burner variously and makes a joint homogeneity is done unnecessary, viewing the condition of a joint like before. Efficient junction can be acquired, further, a shielding effect also improves, trespass of the oxide for a joint is prevented certainly, and there is an advantage of being able to acquire good junction.

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[Translation done.]

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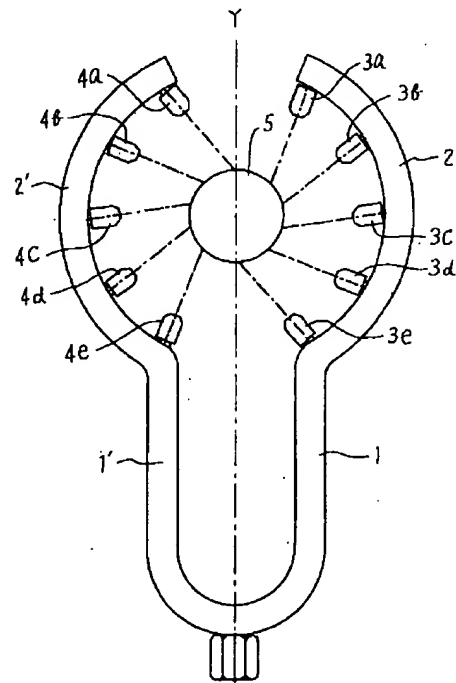
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(54)【発明の名称】 リングバーナ

(57)【要約】

【目的】 丸棒や管の密着法によるガス圧接溶接に使用するリングバーナにおいて、火炎を工作物の周面との交点が工作物の円周に沿って順次移動する箇所に与えることにより火炎が工作物の周面に添って順次放絡線を描いて工作物の周面全体を連続的に円形に包むようにすると共に同じ方向へ傾斜する火炎の包絡線は工作物の周面を螺旋状にうず巻く気流を生じさせて空気を吸い込むで完全燃焼が得られるようにし、効率の良い温度上昇と加熱時間の短縮及びガス使用量の節減を図る。

【構成】 リングバーナの相対する導管円弧部の中心線に対し対称に配置された火口は、円筒状又は円柱状の工作物の周面との交点が工作物の円周に沿って移動するように順次配置し、これらの火口は相対する導管円弧部を含む面に対し同じ方向へ傾斜してなるものである。



## 【特許請求の範囲】

【請求項1】 相対する導管円弧部の中心線に対称に配置された火口は、円筒状又は円柱状の工作物の周面との交点が工作物の円周に沿って移動するように順次配置し、これらの火口は相対する導管円弧部を含む面に対し同じ方向へ傾斜したことを特徴とするリングバーナ。

## 【発明の詳細な説明】

## 【0001】

【産業上の利用分野】 本発明は、例えば軟鋼及び特殊鋼の丸棒や管の密着法によるガス圧接溶接、特に、現場溶接に使用するリングバーナに関するものである。

## 【0002】

【従来の技術】 丸棒や管のガス圧接溶接における密着法（クローズバット法）は、接合させる両部材を接合面で密着させたまま加圧しつつ、接合部の外周をガス炎で材料の融点近くに加熱して圧接する方法であり、この溶接方法に使用する従来リングバーナとして、図9に示すように、並行する導管直長部（a）、（a'）を基端側でU字状に一連に接続し、先端側に相対する導管円弧部（b）、（b'）を有して形成され、これら相対する導管円弧部（b）、（b'）には、相対する導管円弧部（b）、（b'）の中心線Yに対称に配置された多数の火口（c1）～（c5）及び（c6）～（c10）が設けられており、これらの相対する火口（c1）～（c5）及び（c6）～（c10）は、円筒状又は円柱状の工作物（d）の周面との交点が工作物（d）の円周に対称に配置され、しかも相対する導管円弧部（b）、（b'）のそれぞれの端部に位置して相対する火口（c1）と（c6）及び（c5）と（c10）とは加工物（d）の周面との交点がほぼ重なる位置に配置され、また、これら火口（c1）～（c10）は相対する導管円弧部（b）、（b'）を含む面に対し水平に設けられているものが知られている。

## 【0003】

【発明が解決しようとする問題点】 従来技術で述べたリングバーナは、接合部における接合状態は良好で特に問題はないとしても、各火口（c1）～（c10）の火炎は工作物（d）の周面に点状に当たり、しかも火口（c1）と（c6）及び（c5）と（c10）との火炎が工作物（d）の周面で重なるために、加熱が強い箇所と弱い箇所があり、温度上昇に差があり、工作物の周面全体に対する加熱が不均一となって熱の集中が悪くなり、温度上昇の効率が悪く、しかも、加熱が不均一なことから、溶融が早い箇所と遅い箇所ができるために、接合部の溶融の状況を目視によって確かめながら、バーナをいろいろに動かしながら溶接作業を行わなければならない、このような作業は熟練した技術が必要なことは言うまでもなく、工作物の周面全体に対する熱の集中が悪いため、温度上昇の効率が悪く、加熱時間も多くなつて、多くの作業時間と多くのガス使用量を必要とし、溶

接が非能率的である等の欠点があった。

【0004】 本発明は、上記の点に鑑みてなされたものであって、その目的とするところは、火炎を工作物の周面との交点が工作物の円周に沿って順次移動する箇所を与えることにより火炎が工作物の周面に添って順次放絡線を描いて工作物の周面全体を連続的に円形に包むようにして工作物の周面を均一に加熱すると共に同じ方向へ傾斜する火炎の包絡線は工作物の周面に螺旋状にうず巻く気流を生じさせて空気を吸い込むで完全燃焼が得られるようにし、効率の良い温度上昇と加熱時間の短縮を図り、溶接個所の状態に応じてバーナを動かすような特別な熟練技術を必要とすることもなく、能率的な溶接が得られる新規なリングバーナを提供することにある。

## 【0005】

【問題点を解決するための手段】 上記目的を達成するために、本発明のリングバーナは、相対する導管円弧部の中心線に対称に配置された火口は、円筒状又は円柱状の工作物の周面との交点が工作物の円周に沿って移動するように順次配置し、これらの火口は相対する導管円弧部を含む面に対し同じ方向へ傾斜してなるものである。

【0006】 相対する導管円弧部に設けた多数の火口は、各火口と相対する導管円弧部の中心点を結ぶ線と、工作物の外周から略3/1の円との交点を求め、各火口の前記交点を同じ方向へ一周するように一つづつ順次移動させた方向角度に設置するのが好ましい。

## 【0007】

【作用】 加工物の周面を等間隔で順次移動するように配置された火口は、火炎を加工物の周面で同じ方向へ放絡線を描いて連続的な円形の火炎となって加工物の周面全体を包み、加工物に対する加熱が部分的に強い箇所もなく均一に行われるので、保温効果が増加し、熱伝達力を良くする。それに加えて、火口は相対する円弧部を含む傾斜により火炎は加工物の周面に螺旋状の炎となって加工物の周面を回動する気流を生じて空気を吸い込む作用が働き、空気中の酸素を吸い込んで完全燃焼を得ることができ、温度上昇を効率的に得ることができる。また、工作物の継目周面を連続的な放絡線で包むことにより、シールド効果も向上し、溶接部の酸化クロムの発生を減少し、溶接部の健全性と機械的性質を向上させる。

## 【0008】

【実施例】 実施例について図面を参照して説明すると、図1において、並行する導管直長部1、1'を有し、この導管直長部1、1'は基端側でU字状に一連に接続し、先端側には相対する導管円弧部2、2'を有して形成され、これら相対する導管円弧部2、2'には、相対する導管円弧部2、2'の中心線Yに対称に配置された火口3a、3b、3c、3d、3e及び4a、4b、4c、4d、4eが設けられる。

【0009】 相対する導管円弧部2、2'の中心線Yに

対し対称に配置された前記火口3a~3e及び4a~4eは、工作物5の周面との交点が工作物5の円周に沿って同じ方向へ順次一つずつ移動するように配置し、それぞれの火炎が、図4に示すように、工作物5の周面と同じ方向へ放絡線を描いて連続的な円形の炎となって加工物5の周面全体が包まれるようにし、前記火口3a~3e及び4a~4eは、図2及び図3に示すように、相対する導管円弧部2, 2'を含む面に対し同じ方向へ傾斜して設け、図5に示すように、加工物5の周面に連続的な螺旋状の炎となって加工物5の周面を回動する気流が生じて空気を吸い込む作用が生じるようにする。

【0010】この実施例における図1乃至図3に示すバーナは、直径32mmの加工物5に使用するもので、相対する導管円弧部2, 2'に設けた火口3a~3e及び4a~4eの向きは、図6に示すように、各火口3a~3e及び4a~4eと相対する導管円弧部2, 2'の中心点を結ぶ線と、工作物5の外周から略3/1の円との交点P1, P2, P3, P4, P5, P6, P7, P8, P9, P10を求め、各火口の交点P1~P10を同じ方向へ一周するように一つずつ順次移動させた方向角度に設置する。即ち、火口3aは交点P2の方向角度に設置し、火口3bは交点P3の方向角度に設置し、火口3cは交点P4の方向角度に設置し、火口3dは交点P5の方向角度に設置し、火口3eは交点P6の方向角度に設置し、火口4aは交点P7の方向角度に設置し、火口4bは交点P8の方向角度に設置し、火口4cは交点P9の方向角度に設置し、火口4dは交点P10の方向角度に設置し、火口4eは交点P1の方向角度に設置するのが好ましい。

【0011】前記円弧部2, 2'には、各円弧部2及び2'にそれぞれ5個の火口3a~3e及び4a~4eの合計10個が設けられたものを示したが、火口の数、加工物5の直径にしたがって導管円弧部の半径に大小があり、導管円弧部の大きさに応じて火口の数も増減されることは勿論である。

【0012】また、各火口3a~3e及び4a~4eは、図3に示すように、相対する導管円弧部2, 2'を含む面、即ち円弧部2, 2'の中心を通る水平軸Xに対して同じ方向へ10度の傾斜に設定するのが好ましい。

【0013】図7は、図1に示す従来バーナと本発明のバーナの工作物5の加熱時間と温度上昇の関係を示すもので、本発明のバーナを実線で示し、従来バーナを一点

鎖線で示し、この図7から、温度上昇に対する加熱時間が従来のものに比し本発明のものは約4割程度短縮されていることが理解できる。

【0014】図8は、図1に示す従来バーナと本発明のバーナの工作物5の加熱時間とガス消費量の関係を示すもので、本発明のバーナを実線で示し、従来バーナを一点鎖線で示し、この図8から、時間あたりのガス消費量が従来のものに比し本発明のものはガス消費量が約2割程度減少していることが理解できる。

【0015】

【発明の効果】本発明は上記のような構成になるので、効率の良い温度上昇が得られ、ガスの消費量の節約になり、また、接合部に対する温度上昇が均一になされるので、従来のような接合部の状態を目視しながら、バーナをいろいろに動かして接合部を均一にするような熟練した作業を不要とし、能率的な接合を得ることができ、更に、シールド効果も向上し、接合部分の酸化物の侵入を確実に防いで良質の接合を得ることができる等の利点がある。

【図面の簡単な説明】

【図1】本発明のリングバーナの平面図である。

【図2】本発明のリングバーナの側面図である。

【図3】本発明のリングバーナの要部断面図である。

【図4】本発明のリングバーナの火炎の状態を示す正面図である。

【図5】本発明のリングバーナの火炎の状態を示す側面図である。

【図6】本発明のリングバーナの火口の設定角度を求め一例を示す平面図である。

【図7】本発明のリングバーナと従来リングバーナの加熱時間と温度上昇の関係を比較して示す図表である。

【図8】本発明のリングバーナと従来リングバーナの加熱時間とガス使用量の関係を比較して示す図表である。

【図9】従来リングバーナの正面図である。

【符号の説明】

1 導管直長部

2, 2' 導管円弧部

3a~3e 火口

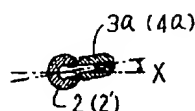
4a~4e 火口

5 工作物

6 火炎

P1~P10 交点

【図3】





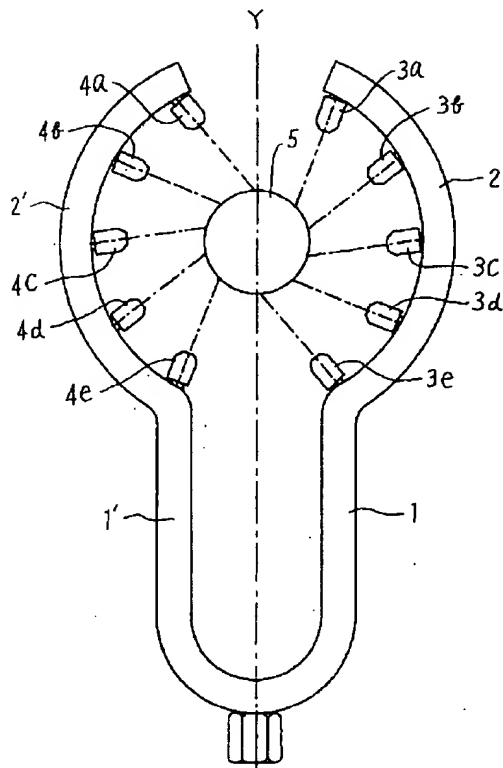
431/8

(4)

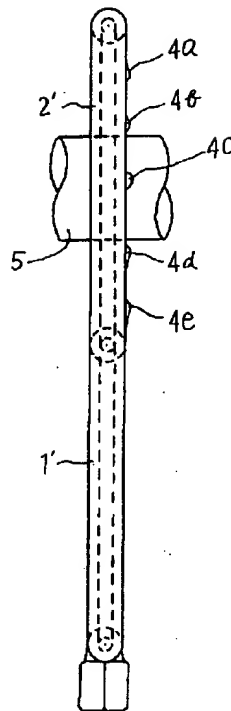
特開平6-313524

P  
\*

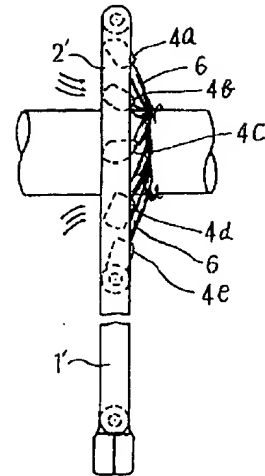
【図1】



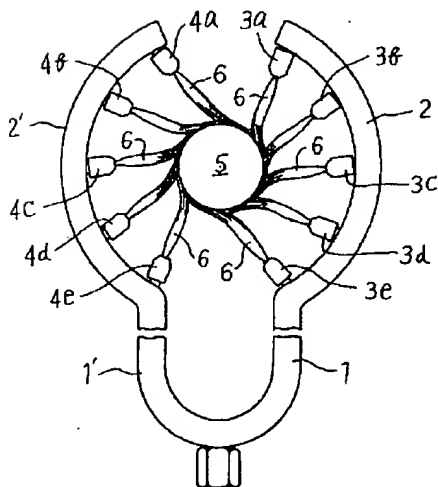
【図2】



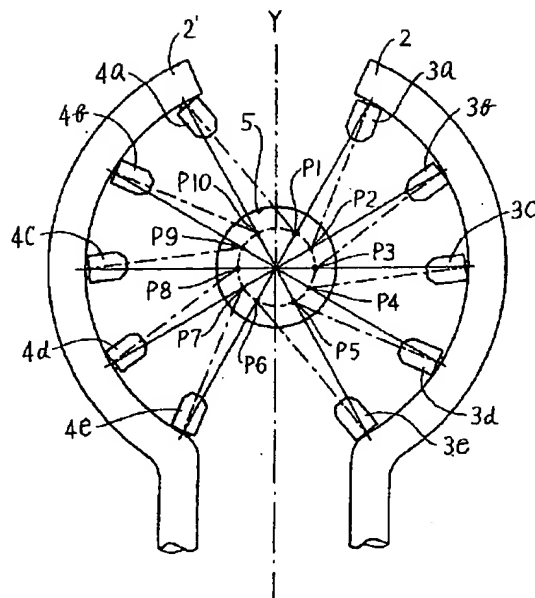
【図5】



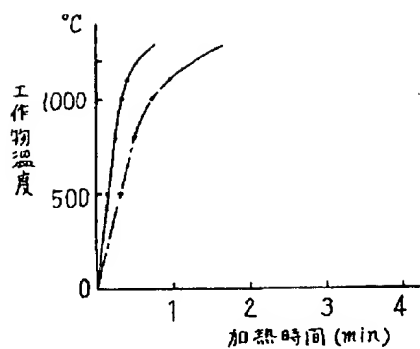
【図4】



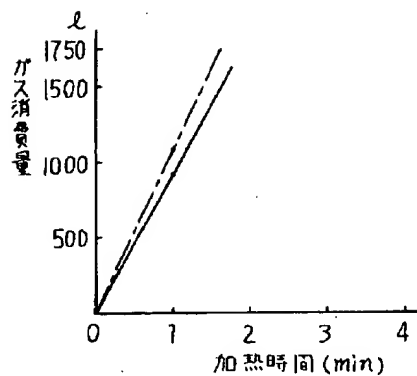
【図6】



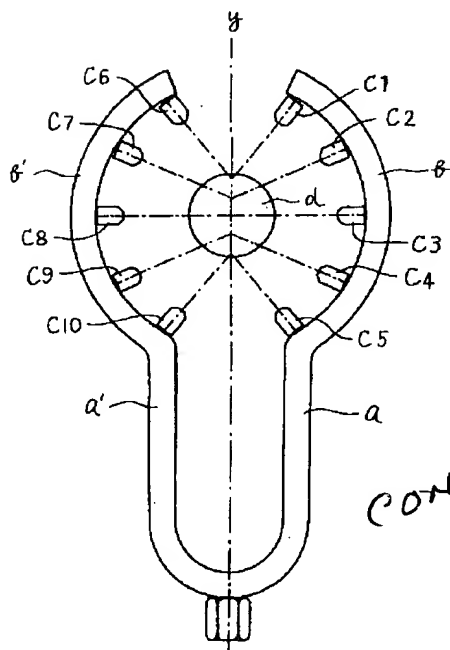
【図7】



【図8】



【図9】



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PAT-NO: JP406313524A  
DOCUMENT-IDENTIFIER: JP 06313524 A  
TITLE: RING BURNER

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INVENTOR-INFORMATION:  
NAME  
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ASSIGNEE-INFORMATION:  
NAME COUNTRY  
ANDO YODANKI KK N/A

APPL-NO: JP05128428  
APPL-DATE: April 30, 1993

INT-CL\_(IPC): F23D014/56; F23D014/40  
US-CL-CURRENT: 431/121

ABSTRACT:

PURPOSE: To contrive efficient temperature rise by a method wherein flame ports are arranged so that an intersecting point between the center line of the flame port and the circumference of a cylindrical work is moved along the circumference of the work and are slanted with respect to a plane including the arced sections of opposing conduit tubes.

CONSTITUTION: Flame ports 3a-3e, 4a-4e, arranged symmetrically with respect to a center line Y of opposed arced sections 2, 2' of conduits, are so arranged that an intersecting point between the center line of a flame port and the circumference of a work 5 is moved sequentially one by one in the same direction along the circumference of the work 5. By this method, respective flames envelop the whole circumference of the work 5 as a continuous circular flame describing an envelope in the same direction at the circumference of the work 5. Further, the flame ports 3a-3e, 4a-4e are slanted in the same direction with respect to a plane including the arced sections 2, 2' of the opposed conduits. Air streams, whirling around the circumference of the work as a continuous spiral flame are generated in such a manner that thereby the sucking effect of air is generated.

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